IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	) FLAME DETECTOR, METHOD and FUEL) VALVE CONTROL
FRED GROW	))
Serial No. 10/775,925	) Group Art Unit 2636)
Filed February 10, 2004	) Examiner Anne Viet Nga Lai

DECLARATION UNDER 37 C.F.R. 132

Fred Grow declares:

I am the inventor of the above identified application. I received a bachelor of science degree in electrical engineering in 1973 from Devry Technical Institute, now Devry University. I have been employed by Protection Controls, Inc., assignee of the application, since 1973. My principal duties are the design of flame detectors and related controls for industrial burners.

Applicant's ultraviolet (UV) sensor tube circuit has an RC quench circuit 24 series connected with the anode/cathode circuit of the UV tube 20. The high voltage power supply 27 provides a substantially constant DC potential for the sensor tube. When tube 20 conducts, a current pulse is generated to drive the LED of opto 1. In the circuit of Mizutani 5,189,398, the UV sensor tube 1 is quenched by a pulsed DC voltage from DC-DC converter 2. The RC circuit 3 generates a voltage pulse for the flame recognition circuit 4. Both applicant's and Mizutani's circuits and their operation are described in detail below.

The Application Circuit

The application circuit will be described with reference to the partial circuits of Attachment 1 in which: FIG. 1 is a schematic diagram of the high voltage power supply; FIG. 2

is a schematic diagram of the UV tube circuit showing representative component values; FIG. 3 is a schematic diagram of the tube circuit at the instant of tube conduction; FIG. 4 is a diagram of the circuit of few picoseconds later; and FIG. 5 is a diagram of the tube circuit as the UV tube is quenched.

The high voltage power supply, FIG. 1, is a voltage doubler which develops a voltage V_o greater than the starting voltage, V_s, of the UV tube. Filter capacitor C8 has ample capacity to power the UV tube.

When the UV tube avalanches the instantaneous impedance of both CQ and C11 is virtually zero. The active circuit at time-instantaneous (T_i) is shown in FIG. 3. There is a high current pulse through the LED of opto 1. However, C11 is fully charged within a few pico-seconds and R10 limits the current through the opto 1 LED to a safe level, FIG. 4.

About 0.5μ sec after T_i, CQ is fully charged and the current through the UV tube is further limited by RQ, as shown in FIG. 5. The voltage across the UV tube is reduced below $V_{sustain}$ and the UV tube begins to turn off. Following turnoff, C11 and CQ discharge through R10 and RQ, respectively, and Vo is again applied to the UV tube.

<u>The Circuit of Mizutani 5,189, 398</u>

The UV sensor of the Mizutani circuit is identified as a Hamamatsu Photonics Co. UV-tron R2868, col2, ln68-col3, ln1. The circuit of FIG. 1 from the 5volt DÇ source through the output timer 4c appears to be based on FIG. 8 that of the Hamamatsu C3704 User's Manual, Attachment 2.

Hamamatsu's recommendations for the use of the UVtron are given in Technical Information, July '84, Attachment 3. Conduction of the UV tube is quenched by a pulsed power supply. A parallel connected CR quench circuit is shown in FIG. 9(a) and uninfiltered rectifier is shown in FIG. 9(b). Further details of the parallel connected CR circuit with recommended circuit constants are described at pages 6-8.

The circuit of CR 3704 is further described in Technical Information ET-04/Sep.88, Attachment 4.

The series connected CR circuit 3 of Mizutani does not quench conduction of the UV tube 1; it merely shapes the voltage pulse signal (b) to the flame recognition circuit 4.

Declarant, being hereby warned that willful, false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon. All statements made of declarant's own knowledge are true and all statements made on information and belief are believed to be true.

Dated this 18 day of January, 2006

Fred Grow

FRED GROW

Fig 1

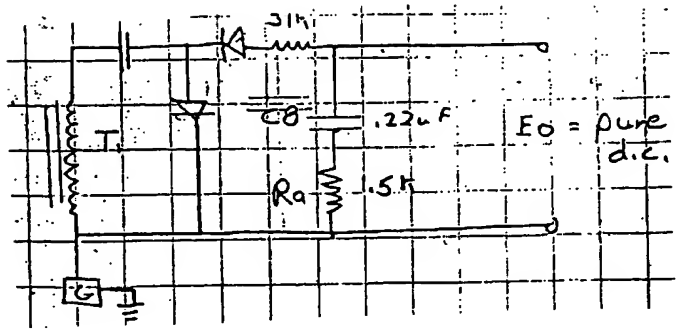


Fig 2

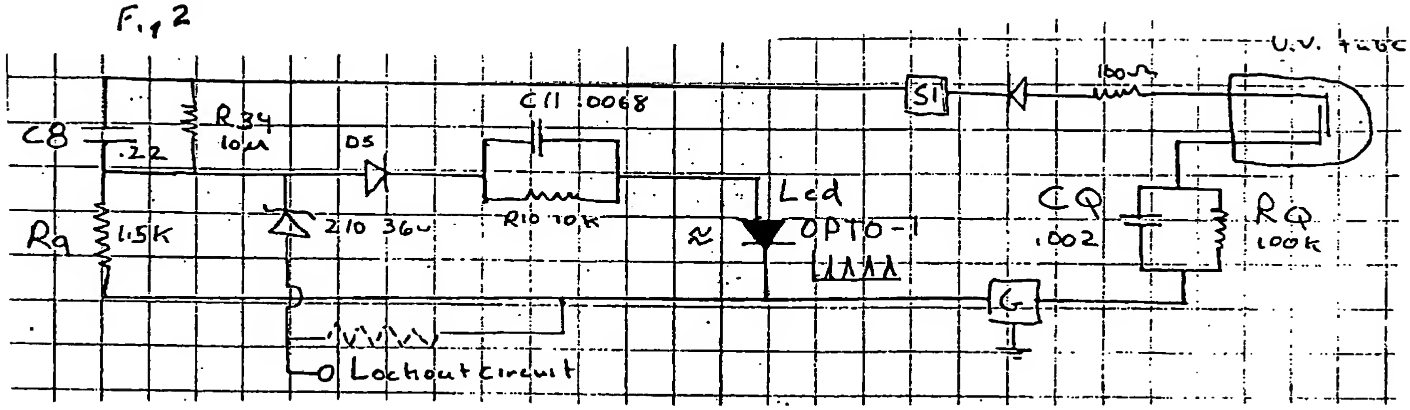


Fig 3

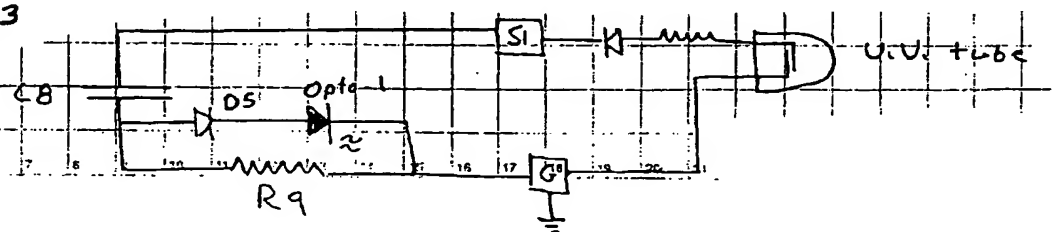


Fig 4

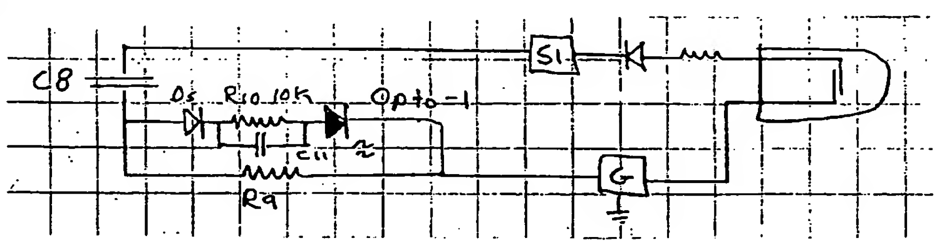
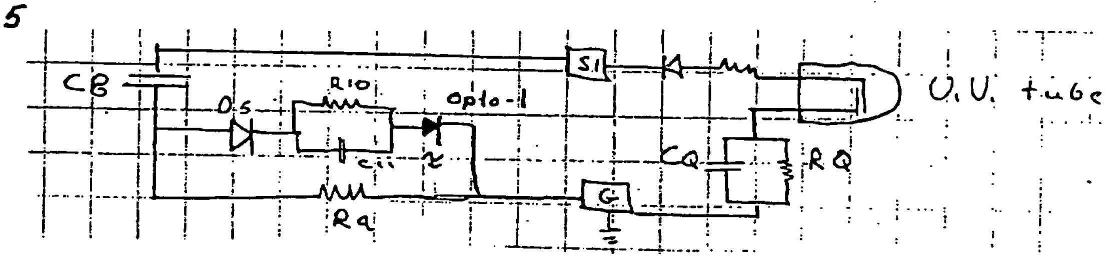


Fig 5



ATTACHMENT 1

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